Salud, Ciencia y Tecnología. 2025; 5:1468
doi: 10.56294/saludcyt20251468

ORIGINAL

The Effect of Treffinger Type Cooperative Learning Model On Creativity and Problem-Solving Ability in Class XI Science Students of SMA N 6 Padang

El efecto del modelo de aprendizaje cooperativo tipo Treffinger sobre la creatividad y la capacidad de resolución de problemas en los estudiantes de ciencias de la clase XI de SMA N 6 Padang

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Citar como: Indrawati ES, Festiyed, Ratnawulan, Sari M. The Effect of Treffinger Type Cooperative Learning Model On Creativity and Problem-Solving Ability in Class XI Science Students of SMA N 6 Padang. Salud, Ciencia y Tecnología. 2025; 5:1468. https://doi.org/10.56294/saludcyt20251468

Submitted: 15-07-2024 **Revised:** 04-10-2024 **Accepted:** 24-02-2025 **Published:** 25-02-2025

Editor: Prof. Dr. William Castillo-González

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ABSTRACT

This research investigates the effect of the cooperative learning type Treffinger for creativity and problem-solving conferences of students in class XI of SMAN 6 Padang. The type of this research is quasi-experimental research design using factorial 2x2. Technical sampling is cluster random sampling. The beginning of data was collected from day examination I. The data results were collected from the final test using an essay instrument test. The Affective data were collected from observation using paper format observation. Then, psychomotor data were collected from practice using a rubric psychomotor. Technical Data analysis cognitive, affective, and psychomotor using two-way ANOVA test with differentiates' test. The results showed that there is student creativity who had cooperative Learning type. Treffinger was higher than students who had a conventional learning approach. Student creativity with beginning high competence was higher than students' lower competence in cooperative Learning type Treffinger. There was no interaction between the cooperative Learning type Treffinger and beginning competence in influencing creativity. Students' problem solving that had cooperative Learning type Treffinger was higher than students who had conventional learning approach. Students' problem-solving with beginning high competence was higher than students with beginning lower competence in cooperative Learning type Treffinger. There was no interaction between the cooperative learning type Treffinger with beginning competence in influencing problem-solving.

Keywords: Cooperative Learning Models; Learning Treffinger; Creativity; Problem-Solving Ability.

RESUMEN

Esta investigación tiene como objetivo investigar el efecto del tipo de aprendizaje cooperativo Treffinger para la creatividad y la resolución de problemas de los estudiantes de la clase XI de SMAN 6 Padang. El tipo de investigación es un diseño de investigación cuasi-cuasi-experimental utilizando factorial 2x2. El muestreo técnico es un muestreo aleatorio por conglomerados. El inicio de los datos se recogió a partir del día de examen I. Los resultados de los datos cognitivos se recogieron a partir de la prueba final mediante una prueba instrumental de ensayo. Los datos afectivos se recogieron a partir de la observación en formato papel. A continuación, se recogieron los datos psicomotrices de la práctica utilizando la rúbrica psicomotriz. Análisis de datos cognitivos, afectivos y psicomotores mediante el test de ANOVA de dos vías con test de diferencias.

Los resultados mostraron que existe una mayor creatividad de los estudiantes que tenían un enfoque de aprendizaje convencional. La creatividad de los estudiantes con alta competencia inicial fue mayor que la de los estudiantes con menor competencia en el tipo de aprendizaje cooperativo Treffinger. No hubo interacción entre el tipo de aprendizaje cooperativo Treffinger y la competencia inicial para influir en la creatividad. La resolución de problemas de los estudiantes que tenían el tipo de aprendizaje cooperativo Treffinger fue mayor que la de los estudiantes que tenían un enfoque de aprendizaje convencional. La resolución de problemas de los estudiantes con una competencia inicial alta fue mayor que la de los estudiantes con una competencia inicial inferior en el tipo de aprendizaje cooperativo Treffinger. No hubo interacción entre el tipo de aprendizaje cooperativo Treffinger con la competencia inicial para influir en la resolución de problemas.

Palabras clave: Modelos de Aprendizaje Cooperativo; Aprendizaje Treffinger; Creatividad; Capacidad de Resolución de Problemas.

INTRODUCTION

Education is a need that must be fulfilled in the life of society, nation, and state. The government has declared education to be an instrument to build a better Indonesian nation and state. Education is a very important means for everyone to improve the quality of human resources. With education, a person can develop their skills, talents, and creativity. The government is working to ensure that the quality of education in elementary schools, secondary schools, and universities is better in the future so that student learning outcomes show better figures. The quality of education is reflected by the competency of graduates, which is influenced by the quality of the educational process and content. The government strives to improve the quality of education, including updating the curriculum, providing aid funds to schools that have limited facilities, and equalizing teachers.[1]

The implementation of the KTSP and syllabus refers to increasing student competence, meaning that to achieve educational goals, teachers must be able to provide extensive learning opportunities to develop their potential. Implementation of physics learning in the KTSP.[2] It is stated that the implementation of physics learning is required to be able to develop the ability to think, work, and behave scientifically, as well as communicate, as an important aspect of life skills. The abilities required in KTSP are contained in three domains, namely, affective (attitude), psychomotor (skills), and cognitive (ability), affective domain, speaking about attitudes, enthusiasm, tolerance, responsibility, etc., psychomotor domain, speaking regarding student skills, for example, speaking skills, expressing opinions, and presenting reports (both oral and written), the cognitive domain talks about the abilities that students should have, for example, the ability to understand concepts, reasoning and communication skills, problem-solving abilities, critical thinking skills, mathematical reflective thinking ability, and creative thinking ability.[3]

In a world that is changing so quickly, creativity is a determinant of excellence. The competitive power of a nation is also determined by the creativity of its human resources. Creativity is needed in every area of life. Creativity is needed to design things, improve the quality of life, create change, and solve problems. Meanwhile, almost every area of human life requires problem-solving abilities; even success in life is largely determined by the ability to solve problems both on a large and small scale. In this context, creativity becomes a prerequisite for individuals to solve problems.[4]

Student creativity in the field of education has received considerable attention. One of these efforts is policy-making in the education sector to include increased creativity in various educational activities, whether included in the curriculum, learning strategies, or other learning tools. This effort is intended so that in every educational or learning activity, students can be trained in skills that can develop creativity, especially in solving problems faced by students. Creativity is also one of the graduation standards for middle school and high school students.[5] Middle and high school graduates are expected to have the ability to think logically, analytically, systematically, critically, and creatively, as well as have the ability to work together. These ideal abilities are expected to be achieved through a well-designed learning process. Creativity and problem-solving abilities can be applied through physics learning. At the SMA/MA level, physics is considered important to be taught as a separate subject with several considerations. First, apart from providing knowledge to students, the Physics subject is intended as a vehicle for developing thinking skills that are useful for solving problems in everyday life. Second, physics subjects need to be taught for a more specific purpose, namely, providing students with the knowledge, understanding, and many abilities required to enter a higher level of education and develop science and technology.[4,6]

The reality in the field is that creativity and problem-solving abilities are rarely paid attention to by teachers. Learning science is often interpreted as an activity of memorizing a concept or carrying out arithmetic operations. Teachers teach science material, especially physics, in schools, some of which are still traditional, focusing on formula training, practicing calculation questions, and memorizing concepts. Teachers view the conventional learning model as an effective procedure for teaching science material. Based on the description above, it appears that the learning model used has not been able to increase creativity and problem-solving abilities.[7,8,9,10] As a result of these problems, students' creativity and problem-solving abilities do not develop, so currently, physics learning outcomes are still ranked lowest compared to other fields of study, both in school exams and in national exams. The results of the first observation carried out at SMAN 6 Padang showed the average score for the 2011/2012 semester 2 exams. The scores obtained by students have not reached the Minimum Completion Criteria (KKM) set by the school, namely 70. It can be seen in table 1.

Table 1. Average Final Exam Score for Semester 2 2011/2012

No	Class	Value
1	X1 1	50,78
2	X1 2	49,38
3	X1 3	49,87
4	X1 4	54,74
5	X1 5	50,76

Source: SMAN 6 Padang

The author conducted a second observation on May 6, 2013 with the Physics teacher of the Class. It has creative abilities and problem-solving abilities, while the physics field of study requires more thinking and is required to have creativity and problem-solving abilities. Other factors apart from the factors above that can influence the success of physics learning include initial abilities, learning motivation, student interests, and talents. Of these four factors, initial ability has quite an influence on physics learning outcomes because the problems that arise in this research are indicators that show that there are differences in the level of initial ability between students. The fact found at SMAN 6 Padang is that some teachers have not explored students' potential from their initial abilities, so teachers cannot recognize each student's characteristics regarding the acceptance of physics material.[1]

It is very important to know students' initial abilities to determine where learning will start and what kind of learning model is suitable for students with different levels of initial abilities. Lack of recognition of students' initial abilities will have an impact on students' inability to link previously known material with the material to be studied.[11] States that "initial abilities are obtained from previous learning experiences which are needed as a prerequisite for recognizing changes". From the description above, several problems affect creativity and problem-solving abilities. To overcome these problems, the author tries to apply the Treffingger-type cooperative learning model, with the steps being: (1) Basic tools or Creativity I techniques include divergent thinking skills and techniques- creative techniques. These technical skills include how to develop fluency and flexibility as well as a willingness to express creative thinking to others, (2) Level II or Practice with process, which gives students the opportunity to apply what they have learned at level I in practical situations, (3) Level III or working with real problems, namely applying the skills learned at level II to challenges in the real world. Here, students use their abilities in ways that are meaningful for their lives.[3]

This Treffingger-type cooperative model is a learning model that helps students to think creatively in solving problems and helps students master physics concepts, as well as providing opportunities for students to show their potential and abilities, including creativity and problem-solving abilities. Several researchers have also conducted research to find suitable learning models to overcome problems related to creativity and problem-solving abilities. Among them, [12] concluded that applying the Treffingger model can improve students' creative abilities and ability to solve mathematical problems. [13] has also conducted similar research, which concluded that Treffinger model learning can foster creativity in solving arithmetic operation problems. Sentaury [14,15,16,17,18] has also conducted research that concluded that the Treffinger model has been able to improve student learning outcomes.[19,20,21,22,23,24] concluded that the mathematics learning outcomes of students who used the Treffinger learning model were better than the mathematics learning outcomes of students who used conventional learning. However, several of the researchers above examined student learning outcomes in general, therefore, the author was interested in investigating the influence of the Treffinger-type cooperative learning model on creativity and problem-solving abilities.[4]

Theoretical Review

Cooperative Learning Model

Cooperative learning is a group learning system. Where students are grouped from various backgrounds.[1] "Saying that cooperative learning is a learning model that uses a grouping system or small teams, namely between

4 and 6 people who have different (heterogeneous) academic backgrounds, genders, tastes, or ethnicities. In line with that, [3] said, "Cooperative learning models are practical classroom techniques that teachers can use every day to help students learn every subject, from basic skills to complex problem-solving. In cooperative learning, students work in small groups to help each other learn. "These groups consist of students with high, average, and low learning outcomes, men and women, and students with different backgrounds." From the opinion above, it can be concluded that the cooperative learning model is a group learning model, namely a series of learning activities carried out by students in certain groups to achieve the learning objectives that have been formulated.

Treffinger-type Cooperative Learning Model

The Treffinger-type cooperative learning model is a model discovered by Dr. Donald J. Treffinger in 1980.[25,26,27] This learning can help students to think creatively in solving problems, help students master the physics concepts taught, and provide opportunities for students to show their potential and abilities, including creativity and ability. Solution to the problem. Creativity possessed by students means that students can explore their potential in creativity, find ideas, and find solutions to the problems they face, which involve thinking processes.[6] According to [28] the Treffinger Type is one of the few models that addresses creativity issues directly and provides practical suggestions on how to achieve integration.

By involving both cognitive and affective skills at each level of this model, Treffinger shows the interrelationship and dependence between the two in encouraging creative learning. Apart from the creative learning process, divergent thinking processes (processes of thinking in various directions and producing many alternative solutions) and convergent thinking processes (thinking processes that search for a single answer) are used.[10]

The Treffinger model of creative learning can help students think creatively in solving problems, help students master the concepts of the material being taught, and provide opportunities for students to show their potential abilities, including creativity and problem-solving abilities. Students' creativity means that students can explore their potential in creativity, find ideas, and find solutions to the problems they face, which involve the thinking process.[9]

Understanding Creativity

Creativity is a difficult field of study, giving rise to differences in views among educational experts. These differences include, among other things, various definitions of creativity and creativity theories, the creative process, the relationship between creativity and intelligence, creative characteristics, and creativity criteria. Creativity is defined in different ways. There are so many different definitions that the definition of creativity depends on the views of the person defining it.[8]

Creativity means creative power or creative progress. In this case, creativity is defined as the ability to create new compounds or combinations from previously existing elements, even in simple form. Meanwhile, according to Drevdahl[29,30] in [13] says: creativity is a person's ability to produce any composition, product, or idea that is new, and previously unknown to the creator, which can be in the form of imaginative activities or synthetic thinking whose results are not merely summaries, may include the formation of new patterns and the combination of information obtained from previous experiences and the grafting of old relationships to new situations and may include the formation of new correlations, must have a defined aim or purpose, not mere fantasy, even if it is incomplete and incomplete results. It may be in the form of an artistic product, literary product, or scientific product, or it may be procedural or methodological.[7]

According to [31] in [13] creativity is an activity that produces results that are new, useful, and understandable. Meanwhile, according to Baron[28] creativity is the ability to produce/create something new. James R. Evans[32,33,34] says that creativity is the skill of determining new relationships, seeing a subject from a new perspective, and forming new combinations from two or more concepts that have been imprinted in the mind. Meanwhile, according to Robert W. Olson[32,33,34] creativity is the ability to create or create; creativity is often considered fluency and flexibility, and can also be said to be the ability to produce new ideas or fresh insights.

[28] in [13] creativity is the ability to create new combinations that have social meaning. Meanwhile, the experts' conclusions regarding creativity in [31] are:

1. Creativity is the ability to create new combinations based on existing data, information, or elements.
2. Creativity (creative thinking or divergent thinking) is the ability, based on available data or information, to find many possible answers to a problem, where the emphasis is on quantity, effectiveness, and diversity of answers.
3. So, operationally, creativity can be formulated as an ability that reflects fluency, flexibility, and originality in thinking, as well as the ability to elaborate (develop, enrich, detail) an idea.

Based on the description of the opinions above, it can be concluded that creativity is a process that leads to the creation of something new and different, where creation depends on the acquisition of knowledge received and has a goal that brings benefits to the person himself or his social group and is expected to into new, more innovative work.

Academic Field

Initial Capabilities

Initial abilities are physics competencies (learning outcomes) that students obtain before gaining higher abilities. Students' initial abilities are a prerequisite for participating in learning so that they can carry out the learning process well. A person's initial abilities obtained from previous training processes are very useful for facing new experiences.[11] States that "initial abilities are obtained from previous learning experiences which are needed as a prerequisite for recognizing changes". [35,36,37] states, "Students' initial abilities are determined by giving an initial test". The initial abilities of students are important for teachers so that they can provide the right dose of lessons, not too difficult and not too easy. Initial abilities are also useful for taking the steps necessary to understand new abilities. Initial abilities are lower than new abilities in learning, initial abilities are a prerequisite that students must have before entering the next higher level of learning material. So, a student who has good initial abilities will understand the material more quickly compared to students who do not have initial abilities in the learning process.

[38,40] refers to initial abilities as entering behavior or initial behavior. Initial abilities or initial behaviors are behaviors that a student has acquired before he or she acquires certain new terminal behaviors. Initial behavior determines the current status of students' knowledge and skills and leads to future status designed by the teacher. In the process of understanding learning material, initial ability is the main factor that will influence the learning experience for students.[41]

Understanding Conventional Learning Models

[42] Conventional means are based on custom or tradition. Conventional learning is learning that is usually carried out by teachers.[43] According to the Ministry of National Education[44,45,46,47] conventional means are based on general conventions (agreements) (such as customs, customs, customs); traditional. About improving the quality of education, Zamroni, in Nursisto[48,49,50], the conventional model is an effort to improve the quality of education that relies rigidly on the input-process-output paradigm. With the teaching and learning process, the conventional learning model, which relies on methods that are commonly used in classroom learning activities, is called the conventional learning model.

The conventional model is a learning model that is carried out by combining various learning methods. In practice, this method is teacher-centered, or the teacher dominates in learning activities. The learning method used is in the form of lectures, assignments, and questions and answers. The conventional model is a learning model that is widely implemented in schools today, which uses a sequence of activities providing descriptions, examples, and exercises.[51,52]

From the description above, it can be concluded that conventional learning is a term in learning that is commonly applied in everyday learning. The learning design is linear and designed from separate sub-concepts to more complex concepts. Linear learning means that one step follows another step, where the second step cannot be done before the first step is done. Conventional learning rarely involves activating prior knowledge and rarely motivates students to process their knowledge. Conventional learning is still based on the assumption that knowledge can be transferred completely from the teacher's mind to the student's mind.

Teaching activities in conventional learning tend to be directed at the flow of information from teacher to student, and the use of the lecture method seems very dominant. The teaching pattern looks standard, namely explaining while writing on the blackboard interspersed with questions and answers, while students pay attention to the teacher's explanation while taking notes in notebooks. Students are seen as passive individuals whose only job is to listen, take notes, and memorize. Learning that occurs in the conventional model is teacher-centered, and there is no good interaction between students and students. Conventional learning tends to be rote learning, which tolerates convergent responses and emphasizes conceptual information, practice questions, and assessment is still traditional with paper and pencil tests which only require one correct answer. This has direct implications for the learning process in the classroom, namely that the class situation will become passive because the interaction only takes place in one direction and the teacher does not pay enough attention to and utilize the students' potentials and their ideas as reasoning power.[53,54,55]

METHOD

This type of research is quasi-experimental (Quasi-Experimental Research) because the researcher does not control or manipulate all relevant variables except for a few variables being studied.[56,57,58] states that "Quasi-experimental research aims to obtain information that is an approximation of the information obtained by actual experimentation in circumstances where it is not possible to fully control all variables."

The research design used was Treatment By Block (2x2). The Treatment By Block (2x2) design is a multifactorial research design (many factors), which is better known as the 2x2 factorial design.[56,57,58] The sample was divided into two groups, namely, the experimental class and the control class. The experimental class is a class that uses the Treffinger-type cooperative learning model, and the control class is a class that uses a conventional learning model. Sugiyono (2008:149) states that the design framework for this research is shown in table 1.

Table 2. Research Design

Initial abilities	Learning Model	
	Treffinger type cooperative learning model	Conventional learning model
High (B1)	A1B1	A2B1
Low (B2)	A1B2	A2B2

RESULT

Based on the data description, requirements test, and hypothesis test that have been explained in the previous sub-chapter, it can be seen that the average value of students' creativity and problem-solving abilities in the cognitive, affective, and psychomotor domains of classes that use the Treffinger type cooperative learning model is significantly different from that of classes. Which uses conventional learning models. Based on the results of hypothesis testing, several things need to be discussed. The complete description is as follows.

Hypothesis One: The creativity of students who receive the Treffinger Type Cooperative Learning Model is higher compared to students who receive the conventional learning model.

The first hypothesis reads, "The creativity of students who receive the Treffinger-type cooperative learning model is higher than students who receive the conventional learning model. The results of testing the first hypothesis for the cognitive domain showed that the average creativity score for the class that received the Treffinger-type cooperative learning model was 52, while the average score for students' creative abilities in the class that received the conventional learning model was 44,06. After being tested statistically, it was stated that there were differences in the creativity of the two sample classes. This difference in creativity is an indicator of using the Treffinger-type cooperative learning model on creativity.

In [28] treffinger-type cooperative learning has contributed to the development of a curriculum for gifted students who show an increase in skills not limited to basic skills. This model shows graphically that creative learning has levels from relatively simple to complex. Creatively gifted children can master level I and II skills more quickly than other students. For them, the proportion of time and energy for low levels can be reduced. All students in the class can be involved in levels I and II activities, but only a few can proceed to the implementation stage (level III).

By understanding the steps used in the Treffinger model, you will be able to increase your creativity and problem-solving abilities. This is based on the following things: first, Treffinger's model is based on the development of creativity or learning theory, which involves cognitive-affective processes. Second, efforts to increase and improve thinking performance and creative attitudes are carried out systematically by focusing on the learning process to solve problems. Third, although activities are intended for individual self-development, learning techniques can generally be carried out in groups. Fourth, the materials and Treffinger-type cooperative learning model can be carried out in an integrative manner.

Apart from that, the methods and materials of the Treffinger-type cooperative learning model are considered to have advantages in their application, namely: (1) the Treffinger model is based on the assumption that creativity is a learning process and result, (2) it is implemented on all students in various backgrounds and levels of ability, (3)) integrates cognitive and affective dimensions in its development, (4) gradually involves convergent and divergent thinking abilities in the problem-solving process, (5) has systematic development stages, with a variety of methods and techniques for each stage that can be applied flexibly.[59] In his journal entitled Development of Students' Creative Thinking Abilities in Mathematics Learning Using the Indonesian Realistic Mathematics Education Model (PMRI), stated that the development of creative thinking abilities in mathematics learning using the PMRI model is due to the PMRI principles and characteristics applied in learning.[9,10] The principle of rediscovering a mathematical concept allows students to experience the discovery of the concept themselves. The characteristics of modeling in solving mathematical problems also make it possible to develop students' creative thinking abilities. With this principle, students can carry out creative activities in solving mathematical problems, especially open mathematics problems.[1,3,4,6,7,8,60]

From data analysis using two-way ANOVA, it was found that the F value from the calculation was 57,44, while the F value from the table was 4,15. This shows that the calculated F value is greater than table F. Thus, it can be said that there are differences in the creativity of the two sample classes. This difference in creativity is an indicator that there is an influence of the Treffinger Type Cooperative Learning Model on the physics creativity of students in class XI Science at SMAN 6 Padang.

Affective domain creativity for the experimental class was also higher compared to the control class. The average value of creativity in the affective domain for classes that use the Treffinger-type cooperative learning model is 78,00, and for classes that use conventional learning models, it is 71,60. creativity in the psychomotor domain of experimental class students is good because it is far above the KKM. From data analysis using two-way ANOVA, it was found that the F value from the calculation was 16,24, while the F value from the table was 4,15. This shows that the calculated F value is greater than Table F. Thus, it can be said that there is a difference in the creativity of students who receive the Treffinger-type cooperative learning model and students who receive the conventional learning model. This difference in creativity is an indicator that there is an influence of the Treffinger-type cooperative learning model on student creativity in class XI Science at SMAN 6 Padang.

Creativity in the psychomotor domain for the experimental class was also higher compared to the control class. The average score for creativity in the psychomotor domain for classes that use the Treffinger-type cooperative learning model is 71,75, and for classes that use conventional learning models, it is 67,30. creativity in the psychomotor domain of experimental class students is good because it is far above the KKM, while the creativity of control class students is still below the KKM. However, both sample classes have shown good results in the psychomotor domain of creativity. From data analysis using two-way ANOVA, it was found that the F value from the calculation was 16,90, while the F value from the table was 4,15. This shows that the calculated F value is greater than Table F. It can be concluded that the creativity of students who use the Treffinger-type cooperative learning model is higher than those who receive conventional learning models in the psychomotor domain in class XI Science at SMAN 6 Padang.

Second Hypothesis: The creativity of students with high initial abilities is higher than students with low initial abilities in the Treffinger-type cooperative learning model. In testing the second hypothesis in the cognitive domain, it was found that the creativity of students with high initial abilities was higher than that of students with low initial abilities in the Treffinger-type cooperative learning model. The score of students with high initial abilities was 64,7, while the creativity of students with low initial abilities was 38,0. This difference in creativity is statistically very significant. From data analysis using two-way ANOVA, it was found that the F value from the calculation was 146,7, while the F value from the table was 4,15. This shows that the calculated F value is greater than Table F. Thus, it can be said that there is a difference in the creativity of students with high initial abilities and students with low initial abilities. This difference in creativity is an indicator that there is an influence of the Treffinger-type cooperative learning model on student creativity in class XI Science at SMAN 6 Padang.

The affective domain creativity for students with high initial ability is 78,00, and for students with low initial ability, it is 65,40. From data analysis using two-way ANOVA, it was found that the F value from the calculation was 62,17, while the F value from the table was 4,15. This shows that the calculated F value is greater than Table F. Thus, it can be said that there is a difference in the creativity of students with high initial abilities and students with low initial abilities. This difference in creativity is an indicator that there is an influence of the Treffinger-type cooperative learning model on student creativity in class XI Science at SMAN 6 Padang in the affective domain.

For the psychomotor domain, the average creativity obtained for students with high initial abilities was 79,80, and for students with low initial abilities was 64,70. From data analysis using two-way ANOVA, the F value from the calculations was 10,80, while the F value from the table was 4,15. This shows that the calculated F value is greater than table F. Thus, it can be said that there is a difference in the creativity of students with high initial abilities and students with low initial abilities. This difference in creativity is an indicator that there is an influence of the Treffinger-type cooperative learning model on student creativity in class XI Science at SMAN 6 Padang.

Creativity in the cognitive, psychomotor, and affective domains of students with high initial ability in the experimental class also experienced much higher changes. Experimental class students are more active in learning and practical activities due to several things, namely: First, each group member in the learning model that uses the Treffinger Type Cooperative Learning Model is required to work together in teams to solve problems that arise in the surrounding environment, so that students are more active during learning and mastering each other's creativity.

Second, there is high individual accountability from students with high initial abilities whose learning uses the Treffinger-type Type Cooperative Learning Model, meaning that students with high initial abilities have a great sense of responsibility to help other group members in learning. The Treffinger Type Cooperative Learning Model can serve the needs of students with above-average abilities. Students who have good learning abilities will not be hampered by students who are weak in learning. The Treffinger Type Cooperative Learning Model provides space for students to learn according to their respective learning styles. For students with high initial abilities, the Treffinger Type Cooperative Learning Model makes it easier for them to link the information that already exists in their cognitive structure with the new information they receive because students with high initial abilities have high abilities in their cognitive structure (Muhfahroyin, 2009:6).[61] A journal entitled Developing Students' Mathematical Creativity in Mathematics Learning Through the Treffinger Model concluded that for students from high and medium-ranking schools, the application of the Treffinger model in mathematics learning provides good results in developing or increasing students' mathematical creativity. So it can be concluded that overall physics learning with the Treffinger Type Cooperative Learning Model has a higher influence on the creativity of students with high initial abilities compared to the conventional learning model for class XI Science students at SMAN 6 Padang.

Third Hypothesis: There is an interaction between the use of Treffinger Type Cooperative Learning and Initial Ability in influencing student creativity.

The fourth hypothesis reads, "There is an interaction between the use of Treffinger-type cooperative learning and initial abilities in influencing student creativity." The results of testing the fourth hypothesis for the cognitive domain using two-way ANOVA analysis showed that the F value from the calculation was 3,34, while the F value from the table was 4,15. This shows that the Fcount price is smaller than Ftable. That means rejecting the null hypothesis. Thus, it can be said that there is no interaction between the use of Treffinger-type cooperative learning and students' initial abilities in influencing the creativity of students' cognitive domains in class XI SMA N 6 Padang.

DISCUSSION

Affective domain creativity for the experimental class was also higher compared to the control class. The average value of creativity in the affective domain for classes that use the Treffinger-type cooperative learning model is 78,00, and for classes that use conventional learning models, it is 71,60. creativity in the psychomotor domain of experimental class students is good because it is far above the KKM. From data analysis using two-way ANOVA, it was found that the F value from the calculation was 0,074, while the F value from the table was 4,15. This shows that the calculated F value is smaller than the F table. Thus, it can be said that there is no interaction between the use of Treffinger-type cooperative learning and students' initial abilities in influencing creativity in class XI SMA N 6 Padang in the affective domain.

For the psychomotor domain, the data were analyzed using two-way ANOVA, It was found that the F value from the calculations was 0,73, while the F value from the table was 4,15. This shows that the calculated F value is smaller than the F table. Thus, it can be said that there is no interaction between the use of Treffinger-type cooperative learning and students' initial abilities in influencing creativity in class XI SMA N 6 Padang in the psychomotor domain. There is no interaction in this treatment, characterized by an equal increase in student creativity at different levels of initial ability, both students who use Treffinger-type cooperative learning and students who use conventional learning models. However, the creativity of students with high initial abilities will also be higher than students with low initial abilities. Likewise, students with low initial abilities in the experimental class will perform better than students with low initial abilities in the control class. This means there is no interaction between Treffinger-type cooperative learning and students' initial abilities.

The results of the same research with different variables were stated by Satria Dewi (2013: 101) that there was no interaction between the use of learning models and students' initial abilities in influencing students' physics learning outcomes, both for aspects, psychomotor and affective. Analysis of data from research by Satri Dewi (2013: 102) found that the physics learning outcomes of students with high initial abilities remained high even with the application of different learning models.

So this research can conclude that there is no interaction between the use of Treffinger-type cooperative learning and students' initial abilities in influencing creativity, both for cognitive, psychomotor, and affective aspects.

CONCLUSIONS

Based on the results of research and hypothesis testing carried out regarding the influence of the Treffinger-type cooperative learning model on creativity and problem-solving abilities, it can be concluded. The creativity of students who receive the Treffinger-type cooperative learning model is higher than students who receive the conventional learning model, both in the cognitive, affective, and psychomotor domains. The creativity of students with high initial abilities is higher than students with low initial abilities in the Treffinger-type cooperative learning model, both for the cognitive, affective, and psychomotor domains. There is no interaction between the Treffinger-type cooperative learning model and initial abilities in influencing student creativity in the cognitive, affective, and psychomotor domains. The problem-solving abilities of students who received the Treffinger-type cooperative learning model were higher than students who received the conventional learning model, both in the cognitive, affective, and psychomotor domains. The problem-solving abilities of students with high initial abilities are higher than those of students with low initial abilities in the Treffinger-type cooperative learning model, both for the cognitive, affective, and psychomotor domains. There is no interaction between the Treffinger-type cooperative learning model and initial abilities in influencing students' problem-solving abilities in the cognitive, affective, and psychomotor domains.

ACKNOWLEDGMENT

The authors express their deepest gratitude to Universitas Negeri Padang and State Islamic University Imam Bonjol, Padang, for providing the resources and academic environment necessary for conducting this research. We would like to extend our heartfelt thanks to the faculty and staff who supported us throughout this study and provided insightful feedback that greatly improved the quality of our work. Additionally, we are indebted to the teachers and students of SMAN 6 Padang for their enthusiastic participation and cooperation, which were pivotal in the successful completion of this research. Finally, we thank our families and colleagues for their unwavering encouragement and support, which motivated us to bring this study to fruition.

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FINANCING
This research did not receive any financial support.

CONFLICT OF INTEREST
The authors declare no conflicts of interest.

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